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Video content extraction and representation using a joint audio and video processing

Saraceno, C.
PRIP Inst. for Autom., Vienna Univ. of Technol. , Austria;

This paper appears in: **Acoustics, Speech, and Signal Processing, 1999. ICASSP '99. Proceedings., 1999 IEEE International Conference on**

Abstract:
Computer technology allows for large collections of digital archived material. At the same time, the increasing availability of potentially interesting data makes difficult the retrieval of desired information. Currently, access to such information is limited to textual queries or characteristics such as color or texture. The demand for new solutions allowing common users to easily access, store and retrieve relevant audio-visual information is becoming urgent. One possible solution to this problem is to hierarchically organize the audio-visual data so as to create a nested indexing structure which provides efficient access to relevant information at each level of the hierarchy. This work presents an automatic methodology to extract and hierarchically represent the semantics of the contents, based on a joint audio and visual analysis. Descriptions on each **media** (audio, video) are used to recognize higher level of meaningful structures, such as specific types of scenes, or, at the highest level, correlations beyond the **temporal organization** of information, allowing it to reflect classes of visual or audio or audio-visual types. Once a hierarchy is extracted from the data analysis, a nested indexing structure can be created to access relevant information at a specific level of detail, according to the user requirements

Index Terms:
audio signal processing   content-based retrieval   feature extraction   image representation   video databases   video signal processing   audio analysis   audio processing   audio-visual information retrieval   automatic method   color   computer technology   correlations   data analysis   digital archived material   information access   nested indexing structure   textual queries   texture   video content extraction   video content representation   video processing   visual analysis

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1 An analysis of XML database solutions for the management of MPEG-7 media descriptions
Utz Westermann, Wolfgang Klas
December 2003 **ACM Computing Surveys (CSUR)**, Volume 35 Issue 4

Full text available: 📄 pdf(448.76 KB)   Additional Information: full citation, abstract, references, index terms

MPEG-7 constitutes a promising standard for the description of multimedia content. It can be expected that a lot of applications based on MPEG-7 media descriptions will be set up in the near future. Therefore, means for the adequate management of large amounts of MPEG-7-compliant media descriptions are certainly desirable. Essentially, MPEG-7 media descriptions are XML documents following media description schemes defined with a variant of XML Schema. Thus, it is reasonable to investigate curren ...

Keywords: MPEG-7, XML database systems, multimedia databases

2 Comparison of access methods for time-evolving data
Betty Salzberg, Vassilis J. Tsotras
June 1999 **ACM Computing Surveys (CSUR)**, Volume 31 Issue 2

Full text available: 📄 pdf(529.53 KB)   Additional Information: full citation, abstract, references, citings, index terms

This paper compares different indexing techniques proposed for supporting efficient access to temporal data. The comparison is based on a collection of important performance criteria, including the space consumed, update processing, and query time for representative queries. The comparison is based on worst-case analysis, hence no assumptions on data distribution or query frequencies are made. When a number of methods have the same asymptotic worst-case behavior, features in the methods tha ...

Keywords: I/O performance, access methods, structures, temporal databases

3 Data modeling of time-based media
Simon Gibbs, Christian Breiteneder, Dennis Tsichritzis
May 1994 **ACM SIGMOD Record , Proceedings of the 1994 ACM SIGMOD international conference on Management of data**, Volume 23 Issue 2

Full text available: 📄 pdf(1.32 MB)   Additional Information: full citation, abstract, references, citings, index terms

Many aspects of time-based media—complex data encoding, compression, "quality factors,"

timing—appear problematic from a data modeling standpoint. This paper proposes timed streams as the basic abstraction for modeling time-based media. Several media-independent structuring mechanisms are introduced and a data model is presented which, rather than leaving the interpretation of multimedia data to applications, addresses the complex organization and re ...

4 Foundations of multimedia database systems
Sherry Marcus, V. S. Subrahmanian
May 1996 **Journal of the ACM (JACM)**, Volume 43 Issue 3

Full text available: 🔁 pdf(4.11 MB)   Additional Information: full citation, abstract, references, citings, index terms

Though numerous multimedia systems exist in the commercial market today, relatively little work has been done on developing the mathematical foundation of multimedia technology. We attempt to take some initial steps towards the development of a theoretical basis for a multimedia information system. To do so, we develop the motion of a structured multimedia database system. We begin by defining a mathematical model of a media-instance. A media-instance may be thought of as "glue" ...

Keywords: data structures, multimedia databases, query languages, query processing

5 View management in multimedia databases
K. Selçuk Candan, Eric Lemar, V. S. Subrahmanian
July 2000 **The VLDB Journal — The International Journal on Very Large Data Bases,** Volume 9 Issue 2

Full text available: 🔁 pdf(322.82 KB)   Additional Information: full citation, abstract, index terms

Though there has been extensive work on multimedia databases in the last few years, there is no prevailing notion of a multimedia view, nor there are techniques to create, manage, and maintain such views. Visualizing the results of a dynamic multimedia query or materializing a dynamic multimedia view corresponds to assembling and delivering an interactive multimedia presentation in accordance with the visualization specifications. In this paper, we suggest that a non-interactive multimedia prese ...

Keywords: Interactivity, Multimedia databases, Prefetching, Result visualization/presentation, View management

6 Inter-organization networks, computer integration, and shifts in interdependence: the case of the semiconductor industry
Paul Hart, Deborah Estrin
October 1991 **ACM Transactions on Information Systems (TOIS)**, Volume 9 Issue 4

Full text available: 🔁 pdf(2.03 MB)   Additional Information: full citation, references, citings, index terms, review

7 Integrating support for temporal media into an architecture for graphical user interfaces
T. C. Nicholas Graham, Tore Urnes
May 1997 **Proceedings of the 19th international conference on Software engineering**

Full text available: 🔁 pdf(1.58 MB)   Additional Information: full citation, references, citings, index terms

Keywords: MVC, groupware, multimedia programming, software architecture

8 Integrating temporal, real-time, an active databases
Krithi Ramamritham, Raju Sivasankaran, John A. Stankovic, Don T. Towsley, Ming Xiong

March 1996 **ACM SIGMOD Record**, Volume 25 Issue 1

Full text available: pdf(497.04 KB) Additional Information: full citation, abstract

> To meet the needs of many real-world control applications, concepts from Temporal, Real-Time, and Active Databases must be integrated: Since the system's data is supposed to reflect the environment being controlled, they must be updated frequently to maintain temporal validity; Many activities, including those that perform the updates, work under time constraints; The occurrence of events, for example, emergency events, trigg ...

9 Query evaluation techniques for large databases

Goetz Graefe

June 1993 **ACM Computing Surveys (CSUR)**, Volume 25 Issue 2

Full text available: pdf(9.37 MB) Additional Information: full citation, abstract, references, citings, index terms, review

> Database management systems will continue to manage large data volumes. Thus, efficient algorithms for accessing and manipulating large sets and sequences will be required to provide acceptable performance. The advent of object-oriented and extensible database systems will not solve this problem. On the contrary, modern data models exacerbate the problem: In order to manipulate large sets of complex objects as efficiently as today's database systems manipulate simple records, query-processi ...

> **Keywords**: complex query evaluation plans, dynamic query evaluation plans, extensible database systems, iterators, object-oriented database systems, operator model of parallelization, parallel algorithms, relational database systems, set-matching algorithms, sort-hash duality

10 Dynamic hypertext and knowledge agent systems for multimedia information networks

Yoshitaka Shibata, Michiaki Katsumoto

December 1993 **Proceedings of the fifth ACM conference on Hypertext**

Full text available: pdf(1.33 MB) Additional Information: full citation, references, citings, index terms

> **Keywords**: agent, human interface, hypermedia, knowledge-base, multimedia

11 An object-oriented SGML/HyTime compliant multimedia database management system

M. Tamer Özsu, Paul Iglinski, Duane Szafron, Sherine El-Medani, Manuela Junghanns

November 1997 **Proceedings of the fifth ACM international conference on Multimedia**

Full text available: pdf(1.77 MB) Additional Information: full citation, references, citings, index terms

12 The LHAM log-structured history data access method

Peter Muth, Patrick O'Neil, Achim Pick, Gerhard Weikum

February 2000 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 8 Issue 3-4

Full text available: pdf(494.76 KB) Additional Information: full citation, abstract, index terms

> Numerous applications such as stock market or medical information systems require that both historical and current data be logically integrated into a temporal database. The underlying access method must support different forms of "time-travel" queries, the migration of old record versions onto inexpensive archive media, and high insertion and update rates. This paper presents an access method for transaction-time temporal data, called the log-structured history data access method (L ...

Keywords: Data warehouses, Index structures, Performance, Storage systems, Temporal databases

13 A cross-media adaptation strategy for multimedia presentations
Susanne Boll, Wolfgang Klas, Jochen Wandel
October 1999 **Proceedings of the seventh ACM international conference on Multimedia (Part 1)**

Full text available: 📄 pdf(1.34 MB)   Additional Information: full citation, abstract, references, citings, index terms

Adaptation techniques for multimedia presentations are mainly concerned with switching between different qualities of single media elements to reduce the data volume and by this to adapt to limited presentation resources. This kind of adaptation, however, is limited to an inherent lower bound, i.e., the lowest acceptable technical quality of the respective media type. To overcome this limitation, we propose cross-media adaptation in which the presentation alternatives can b ...

Keywords: adaptation, multimedia authoring, multimedia presentation, quality of information

14 SIGMOD challenges paper: database issues in telecommunications network management
Ilsoo Ahn
May 1994 **ACM SIGMOD Record , Proceedings of the 1994 ACM SIGMOD international conference on Management of data**, Volume 23 Issue 2

Full text available: 📄 pdf(822.72 KB)   Additional Information: full citation, abstract, references, citings, index terms

Various types of computer systems are used behind the scenes in many parts of the telecommunications network to ensure its efficient and trouble-free operation. These systems are large, complex, and expensive real-time computer systems that are mission critical, and contains a database engine as a critical component. These systems share some of common database issues with conventional applications, but they also exhibit rather unique characteristics that present challenging database issues. ...

15 A comparative study of log-only and in-place update based temporal object database systems
Kjetil Nørvåg
November 2000 **Proceedings of the ninth international conference on Information and knowledge management**

Full text available: 📄 pdf(231.70 KB)   Additional Information: full citation, references, index terms

16 Fast detection of communication patterns in distributed executions
Thomas Kunz, Michiel F. H. Seuren
November 1997 **Proceedings of the 1997 conference of the Centre for Advanced Studies on Collaborative research**

Full text available: 📄 pdf(4.21 MB)   Additional Information: full citation, abstract, references, index terms

Understanding distributed applications is a tedious and difficult task. Visualizations based on process-time diagrams are often used to obtain a better understanding of the execution of the application. The visualization tool we use is Poet, an event tracer developed at the University of Waterloo. However, these diagrams are often very complex and do not provide the user with the desired overview of the application. In our experience, such tools display repeated occurrences of non-trivial commun ...

17 Computing curricula 2001

September 2001 **Journal on Educational Resources in Computing (JERIC)**

Full text available: pdf(613.63 KB)
html(2.78 KB)   Additional Information: full citation, references, citings, index terms

18 Spatial and temporal content-based access to hypervideo databases

Haitao Jiang, Ahmed K. Elmagarmid

December 1998 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 7 Issue 4

Full text available: pdf(241.17 KB)   Additional Information: full citation, abstract, index terms

Providing content-based video query, retrieval and browsing is the most important goal of a video database management system (VDBMS). Video data is unique not only in terms of its spatial and temporal characteristics, but also in the semantic associations manifested by the entities present in the video. This paper introduces a novel video data model called *Logical Hypervideo Data Model*. In addition to multilevel video abstractions, the model is capable of representing video entities that ...

Keywords: Ccontent-based query, Hot object, Hypervideo, Spatial and temporal constraint, Video database

19 Automatic temporal layout mechanisms

M. Cecelia Buchanan, Polle T. Zellweger

September 1993 **Proceedings of the first ACM international conference on Multimedia**

Full text available: pdf(109.15 KB)
ps(451.70 KB)   Additional Information: full citation, references, citings, index terms

Keywords: automatic scheduling, automatic temporal layout, media synchronization, multimedia document formatting, temporal constraints

20 A schema-less spatio-temporal database system

Michael Bodolay, Martha L. Escobar-Molano

March 2000 **Proceedings of the 2000 ACM symposium on Applied computing**

Full text available: pdf(636.81 KB)   Additional Information: full citation, references, index terms

Keywords: SQL, database, spatial, temporal, video

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1 **A model for the perception of temporal patterns**
McAuley, J.D.;
Neural Networks, 1992. IJCNN., International Joint Conference on , Volume: 3 , 7-11 June 1992
Pages:798 - 803 vol.3

[Abstract]   [PDF Full-Text (404 KB)]   **IEEE CNF**

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2 **Self-organization and association for temporal coding**
Amemori, K.; Ishii, S.;
Artificial Neural Networks, 1999. ICANN 99. Ninth International Conference on (Conf. Publ. No. 470) , Volume: 1 , 7-10 Sept. 1999
Pages:162 - 167 vol.1

[Abstract]   [PDF Full-Text (388 KB)]   **IEE CNF**

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1 **SOM associative memory for temporal sequences**
Sakurai, N.; Hattori, M.; Ito, H.;
Neural Networks, 2002. IJCNN '02. Proceedings of the 2002 International Joint Conference on , Volume: 1 , 12-17 May 2002
Pages:950 - 955

[Abstract]   [PDF Full-Text (410 KB)]   **IEEE CNF**

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2 **Video content extraction and representation using a joint audio and video processing**
Saraceno, C.;
Acoustics, Speech, and Signal Processing, 1999. ICASSP '99. Proceedings., 1999 IEEE International Conference on , Volume: 6 , 15-19 March 1999
Pages:3033 - 3036 vol.6

[Abstract]   [PDF Full-Text (344 KB)]   **IEEE CNF**

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